

Amendment to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) An image processing apparatus which executes image processing for an original image, comprising:

defining means for defining a gray level conversion curve to be used for gray level conversion on the basis of a value associated with a contrast of an image resulting from gray level conversion of the original image, the value being calculated from pixel values of the original image; and

gray level conversion means for converting a gray level of the original image by using the gray level conversion curve defined by said defining means;

wherein said defining means defines the gray level conversion curve on the basis of a contrast improvement factor defined by the gray level conversion curve;

wherein to define the gray level conversion curve, the defining means calculates the contrast improvement factor C(d) given by:

$$C(d) = \frac{\int_{dy} \int_{dx} F(d,c)'(f1(x,y)) dx dy}{\int_{dy} \int_{dx} Sgn(f1(x,y)) dx dy}$$

where Sgn (x,y) is given by:

$$Sgn(x,y) = 0 \text{ when } f(x,y) \geq Th1$$

$$Sgn(x,y) = 1 \text{ otherwise}$$

where Th1 is a constant;

wherein F(d,c)' indicates the differential value of the gray level conversion curve, f1(x,y) indicates pixel values of the original image, d is a parameter that indicates a translation amount of the gray level conversion curve with respect to the pixel values and c is the contrast of the gray level conversion curve, which indicates a tilt amount of the gray level conversion curve.

2. (Canceled)

3. (Original) The apparatus according to claim 2, wherein to define the gray level conversion curve, the defining means calculates the contrast improvement factor by fixing the contrast of the gray level conversion curve and translating the gray level conversion curve on a coordinate system whose abscissa represents an input pixel value and whose ordinate represents an output pixel value.

4. (Original) The apparatus according to claim 2, wherein to define the gray level conversion curve, the defining means calculates the contrast improvement factor by changing the contrast of the gray level conversion curve and translating the gray level conversion curve on a coordinate system whose abscissa represents an input pixel value and whose ordinate represents an output pixel value.

5. (Previously Presented) The apparatus according to claim 1, wherein said defining means defines the gray level conversion curve on the basis of the contrast of a specific image region of an object after gray level conversion.

6. (Previously Presented) The apparatus according to claim 1, wherein said defining means defines the gray level conversion curve on the basis of the contrast of a predetermined region of an object after gray level conversion.

7. (Currently Amended) An image processing method of executing image processing for an original image, comprising:

an analysis step of defining a gray level conversion curve to be used for gray level conversion on the basis of a value associated with a contrast of an image resulting from gray level conversion of the original image, the value being calculated from pixel values of the original image; and

a gray level conversion step of converting a gray level of the original image by using the gray level conversion curve defined in the analysis step;

wherein said analysis step defines the gray level conversion curve on the basis of a contrast improvement factor defined by the gray level conversion curve;

wherein to define the gray level conversion curve, the analysis step calculates the contrast improvement factor C(d) given by:

$$C(d) = \frac{\int_{dy} \int_{dx} F(d,c)'(f1(x,y)) dx dy}{\int_{dy} \int_{dx} Sgn(f1(x,y)) dx dy}$$

where Sgn (x,y) is given by:

$$Sgn(x,y) = 0 \quad \text{when } f(x,y) \geq Th1$$

$$Sgn(x,y) = 1 \quad \text{otherwise}$$

where Th1 is a constant;

wherein F(d,c)' indicates the differential value of the gray level conversion curve, f1(x,y) indicates pixel values of the original image, d is a parameter that indicates a translation amount of the gray level conversion curve with respect to the pixel values and c is the contrast of the gray level conversion curve, which indicates a tilt amount of the gray level conversion curve.

8. (Canceled)

9. (Currently Amended) A storage medium which stores an image processing program which executes image processing for an original image, wherein the image processing program causes a computer to execute:

an analysis step of defining a gray level conversion curve to be used for gray level conversion on the basis of a value associated with a contrast of an image resulting from gray level conversion of the original image, the value being calculated from pixel values of the original image; and

a gray level conversion step of converting a gray level of the original image by using the gray level conversion curve defined in the analysis step;

wherein said analysis step defines the gray level conversion curve on the basis of a contrast improvement factor defined by the gray level conversion curve;

wherein to define the gray level conversion curve, the analysis step calculates the contrast improvement factor C(d) given by:

$$C(d) = \frac{\int_{dy} \int_{dx} F(d,c)'(f1(x,y)) dx dy}{\int_{dy} \int_{dx} Sgn(f1(x,y)) dx dy}$$

where Sgn (x,y) is given by:

$$Sgn(x,y) = 0 \quad \text{when } f(x,y) \geq Th1$$

$$Sgn(x,y) = 1 \quad \text{otherwise}$$

where Th_1 is a constant;
wherein $F(d,c)'$ indicates the differential value of the gray level conversion curve,
 $f_1(x,y)$ indicates pixel values of the original image, d is a parameter that indicates a translation
amount of the gray level conversion curve with respect to the pixel values and c is the contrast of
the gray level conversion curve, which indicates a tilt amount of the gray level conversion curve.

10. (Canceled)